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Konica

SERVICE MANUAL

Model
IP-421

SEPTEMBER 2000

CSM-IP421

KONICA BUSINESS TECHNOLOGIES, INC.

IP-421

SERVICE MANUAL

SEPTEMBER 2000

Used on Konica Models
7020, 7030

IMPORTANT NOTICE

Because of the possible hazards to an inexperienced person servicing this equipment, as well as the risk of damage to the equipment, Konica Business Technologies strongly recommends that all servicing be performed by Konica-trained service technicians only.

Changes may have been made to this equipment to improve its performance after this service manual was printed. Accordingly, Konica Business Technologies, Inc., makes no representations or warranties, either expressed or implied, that the information contained in this service manual is complete or accurate. It is understood that the user of this manual must assume all risks or personal injury and/or damage to the equipment while servicing the equipment for which this service manual is intended.

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SAFETY PRECAUTIONS

Installation Environment

Safety considerations usually are directed toward machine design and the possibility of human error. In addition, the environment in which a machine is operated must not be overlooked as a potential safety hazard.

Most electrical equipment is safe when installed in a normal environment. However, if the environment is different from what most people consider to be normal, it is conceivable that the combination of the machine and the room air could present a hazardous combination. This is because heat (such as from fusing units) and electrical arcs (which can occur inside switches) have the ability to ignite flammable substances, including air.

When installing a machine, check to see if there is anything nearby which suggests that a potential hazard might exist. For example, a laboratory might use organic compounds which, when they evaporate, make the room air volatile. Potentially dangerous conditions might be seen or smelled. *The presence of substances such as cleaners, paint thinners, gasoline, alcohol, solvents, explosives, or similar items should be cause for concern.*

If conditions such as these exist, take appropriate action, such as one of the following suggestions.

- Determine that the environment is controlled (such as through the use of an exhaust hood) so that an offending substance or its fumes cannot reach the machine.
- Remove the offending substance.
- Install the machine in a different location.

The specific remedy will vary from site to site, but the principles remain the same. To avoid the risk of injury or damage, be alert for changes in the environment when performing subsequent service on any machine, and take appropriate action.

Unauthorized Modifications

Konica copiers have gained a reputation for being reliable products. This has been attained by a combination of outstanding design and a knowledgeable service force.

The design of the copier is extremely important. It is the design process that determines tolerances and *safety margins* for mechanical, electrical, and electronic aspects. It is not reasonable to expect individuals not involved in product engineering to know what effect may be caused by altering any aspect of the machine's design. Such changes have the potential of degrading product performance and reducing safety margins.

For these reasons, *installation of any modification not specifically authorized by Konica Business Machines U.S.A., Inc., is strictly prohibited.*

The following list of prohibited actions is not all-inclusive, but demonstrates the intent of this policy.

- Using an extension cord or any unauthorized power cord adapter.
- Installing any fuse whose rating and physical size differs from that originally installed.
- Using wire, paper clips, solder, etc., to replace or eliminate any fuse (including temperature fuses).
- Removing (except for replacement) any air filter.
- Defeating the operation of relays by any means (such as wedging paper between contacts).
- Causing the machine to operate in a fashion other than as it was designed.
- Making any change which might have a chance of defeating built-in safety features.
- Using any unspecified replacement parts.

General Safety Guidelines

This copier has been examined in accordance with the laws pertaining to various product safety regulations prior to leaving the manufacturing facility to protect the operators and service personnel from injury. However, as with any operating device, components will break down through the wear-and-tear of everyday use, as will additional safety discrepancies be discovered. For this reason, it is important that the technician periodically performs safety checks on the copier to maintain optimum reliability and safety.

The following checks, not all-inclusive, should be made during each service call:

CAUTION: Avoid injury. Ensure that the copier is disconnected from its power source before continuing.

- Look for sharp edges, burrs, and damage on all external covers and copier frame.
- Inspect all cover hinges for wear (loose or broken).
- Inspect cables for wear, frays, or pinched areas.

- Ensure that the power cord insulation is not damaged (no exposed electrical conductors).
- Ensure that the power cord is properly mounted to the frame by cord clamps.
- Check the continuity from the round lug (GND) of the power cord to the frame of the copier – ensure continuity. An improperly grounded machine can cause an electrically-charged machine frame.

Safeguards During Service Calls

Confirm that all screws, parts, and wiring which are removed during maintenance are installed in their original positions.

- When disconnecting connectors, do not pull the wiring, particularly on AC line wiring and high voltage parts.
- Do not route the power cord where it is likely to be stepped on or crushed.
- Carefully remove all toner and dirt adhering to any electrical units or electrodes.
- After part replacement or repair work, route the wiring in such a way that it does not contact any burrs or sharp edges.
- Do not make any adjustments outside of the specified range.

Applying Isopropyl Alcohol

Care should be exercised when using isopropyl alcohol, due to its flammability. When using alcohol to clean parts, observe the following precautions:

- Remove power from the equipment.
- Use alcohol in small quantities to avoid spillage or puddling. Any spillage should be cleaned up with rags and disposed of properly.
- Be sure that there is adequate ventilation.
- Allow a surface which has been in contact with alcohol to dry for a few minutes to ensure that the alcohol has evaporated completely before applying power or installing covers.

Summary

It is the responsibility of every technician to use professional skills when servicing Konica products. There are no short cuts to high-quality service. Each copier must be thoroughly inspected with respect to safety considerations as part of every routine service call. The operability of the copier, and more importantly, the safety of those who operate or service the copier, are directly dependent upon the conscientious effort of each and every technician.

Remember...when performing service calls, use good judgement (have a watchful eye) to identify safety hazards or potential safety hazards that may be present, and correct these problem areas as they are identified -- the safety of those who operate the copier as well as those who service the copier depend on it!

OVERVIEW

■ Product specifications

● IP-421 print controller

Type: Built in Konica 7020 series copy machine

Paper size: 11"X17", 8.5"x14", 8.5"x11", 5.5"x8.5"

Paper feeding: Same as copier

Output stack capacity: Same as copier

Mode: Possible dual mode of copy machine/printer (up to 5 jobs)

Next job reservation: Next copy job can be reserved during print job.

Special printing features: Printing on both faces, choice of paper type, zoom function, choice of paper tray, choice of output tray, choice of print quality, Alternate function, sort/group function, staple function, layout function, front/back cover intersheet function, booklet function, smoothing function, page protection function, watermark function

Direction of printing: portrait, landscape

Resolution: 600 dpi

Scan Resolution: 600 dpi/400 dpi/300 dpi/200 dpi

Gradation: 2

Number of output pages: 1-999

Warm-up: Same as copier

CPU: Pentium MMX-166Mhz

Memory: 32MB (standard), expandable up to 160MB (option:MU-403 / MU-404 / MU-405)

Cards: Controller board x1
PCI relay board x1
KN-303 Network card (option)

Option:Harddisk Drive (HD-103)
PS option (PS-341)

Interface: Parallel port

Based on Centronics (IEEE 1284)/Amphenol male 36pin connector

Network interface: (option)

KN-303 Network card

Network: Ethernet (100BaseTX/10BaseT)

Protocols: IPX/SPX (NetWare),

TCP/IP (LPD/LPR, peer-to-peer)

AppleTalk (EtherTalk)

Compliant OS:

Windows 95/98

Windows NT4.0/2000

Macintosh

Unix

Printer Language:

PCL

PostScript3 (option)

Printer drivers:

Windows 95/98 printer driver

Windows NT4.0/2000 printer driver

Host computer: A Windows based computer

Macintosh

Unix

Finisher: FS-107

paper tray unit: DB-209,DB-409

Size: 9.4 in (W) x 6.3 in (H) x 1.5 in (D)

Weight: Approximately 2.4 lb.

Power source: 5 V, 2 A or less (supplied from copier)

Operating conditions:temperature: 50 - 86°F,

humidity: 20-80%RH (condensation not allowed)

Restrictive Conditions:

* In the Printer mode, the EKC (Electric Key Counter) of the Konica 7020 series is not available.

* Although the Weekly Timer function of the Konica 7020 series is available in the Printer mode, the power is not turned Off until the data output is finished when print data remains in the E-RDH.

Notice: Specifications are subject to change for improvements without notice.

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■ Product overview

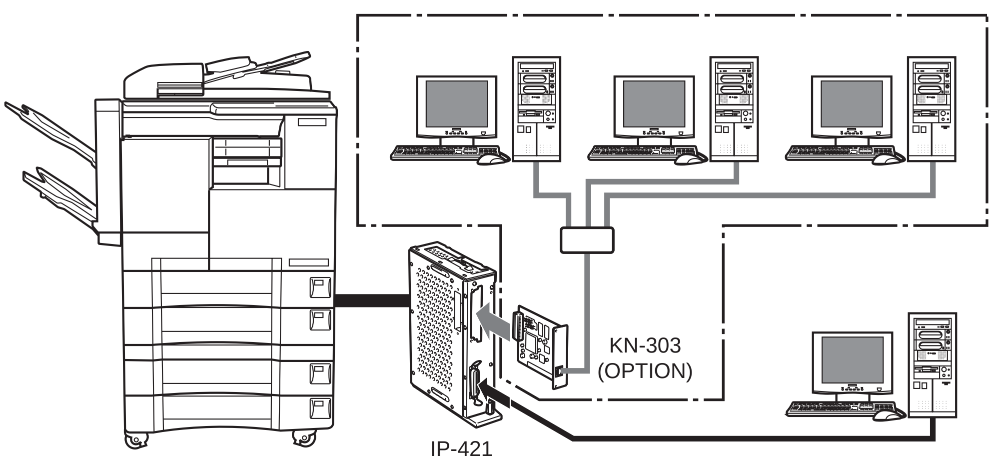
● Capabilities of the IP-421

The Konica IP-421 print controller allows you to use the Konica 7020 series copying machine as a printer connected to computers and a network. It receives print jobs from computers and network and converts them into image data (video data) that the Konica 7020 series copying machine prints out.

The IP-421 print controller is characterized as follows.

* Built in the Konica 7020 series copying machine.
* The drivers interfacing with Windows 95/98 and NT4.0/2000 allow use of the functions of the Konica 7020 series copying machine.
* The KN-303 Network card allows use of the IP-421 as a network printer.
* A system can be upgraded by the renewal of the flash memory.

This Service Handbook describes hardware construction, disassembly and assembly procedures, troubleshooting, and appendixes (upgrading firmware, error messages, etc).



● Startup sequence of the 7020 series + IP-421 system

As the IP-421 is built in the 7020 series, supplying power to the IP-421 and its initialization starts as soon as you turn on the copier. The startup sequence is as follows.

1. Turn on the copier.

   Supplying power to start the IP-421 starts. Its CPU works to test the system memory and the system program starts running.

2. The IP-421 performs system check.

3. On completion of system check, the controller is waiting print job.

   If printer mode is selected, a message “Ready to print” appears.

● Data processing of the IP-421 (See data flow)

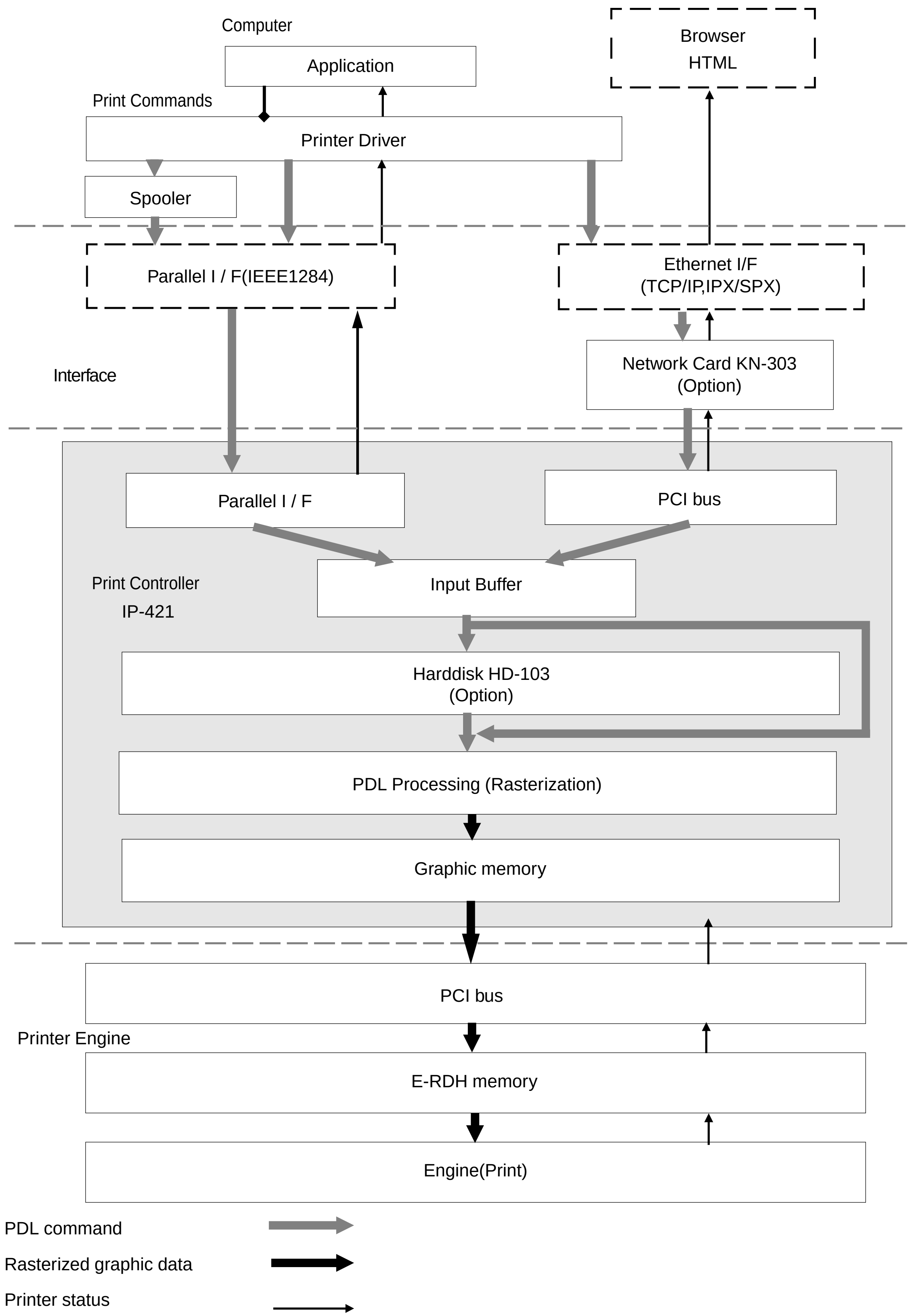
When you attempt to print a document data from a computer connected the IP-421, processing will be made as follows.

1. The print job comes from the computer (or network) to the parallel port (or Ethernet port if the KN-303 is used).

2. The CPU, mounted on IP-421, generates the bit map image of one page to another in the image memory.

3. The bit map image is transferred in the form of video signals from the image memory to the copier and printed.

● **Data flow**


Computer
Application
Browser
HTML
Print Commands
Printer Driver
Spooler
Parallel I / F(IEEE1284)
Ethernet I/F
(TCP/IP,IPX/SPX)
Network Card KN-303
(Option)
Interface
Parallel I / F
PCI bus
Print Controller
IP-421
Input Buffer
Harddisk HD-103
(Option)
PDL Processing (Rasterization)
Graphic memory
PCI bus
Printer Engine
E-RDH memory
Engine(Print)
PDL command
Rasterized graphic data
Printer status

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■ Option

● KN-303 Network card

If the IP-421 is fitted with the KN-303 Network card, the 7020 series can be used as a remote printer from any computer belonging to a network (NetWare/Windows).

● Hard Disk (HD-103)

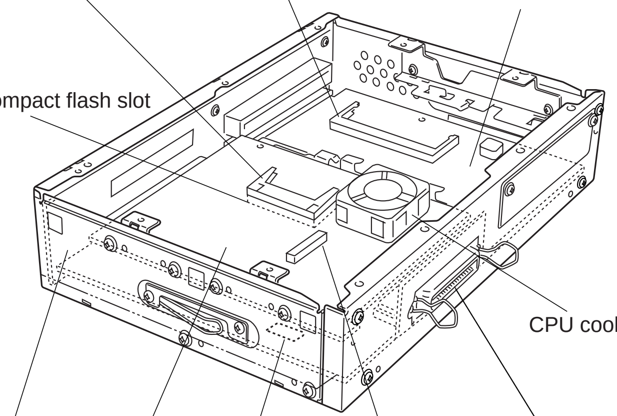
By installing this optional hard disk to the IP-421, you can use the 7020 series copier as a scanner. The scanned data can be read into your PC via an optional Network Interface Card.

● Post Script 3 (PS-341)

By installing this optional PostScript and the standard compact •ash for PostScript to the IP-421, you can use the 7020 series copier as a PostScript printer.

DISASSEMBLY/ ASSEMBLY

■ Construction



⚠Caution:

If grounding is not made securely, the cards can be damaged during work. Make sure to ground your body securely by using a wrist strap before starting to work.

Tool

* Use a Phillips head screwdriver.

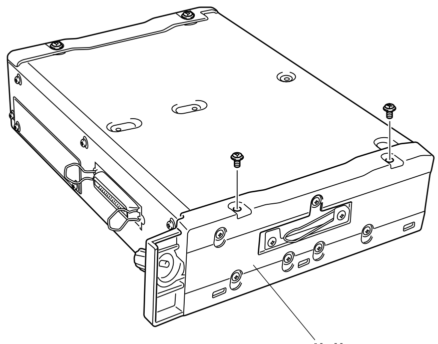
Reference information:

As the IP-421 is provided with a “flash memory”, no tool is needed to replace ROM for upgrading the firmware.

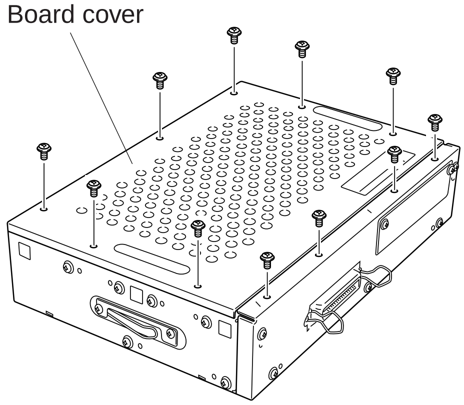
■ Disassembly/Assembly procedures

● Removal/Installation of boards

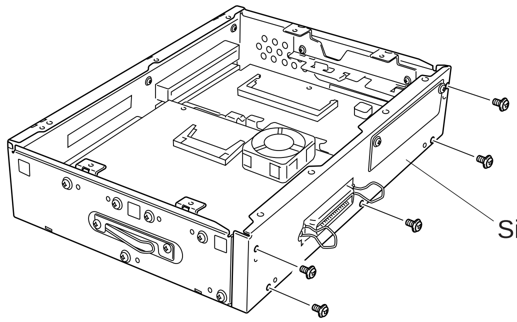
1. Remove the sliding cover. (2 screws)



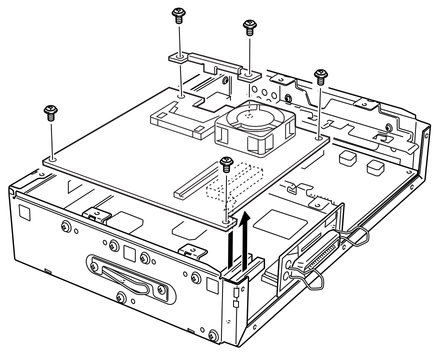
2. Remove the Board cover. (11 screws)



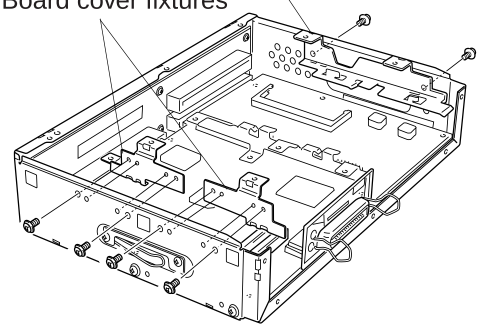
3. Remove the side cover of the parallel connector side. (5 screws)



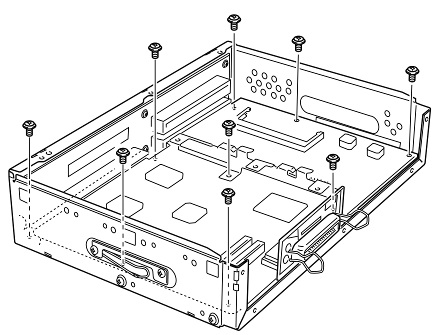
4. Remove the printer relay board. (5 screws)



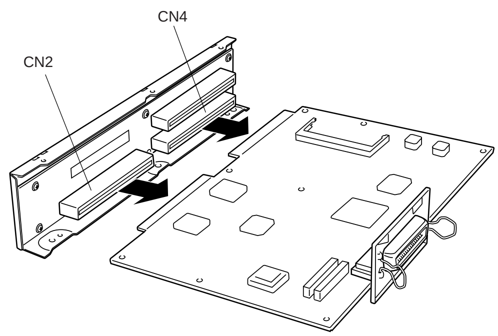
5. Remove the Board cover fixtures. (6 screws)



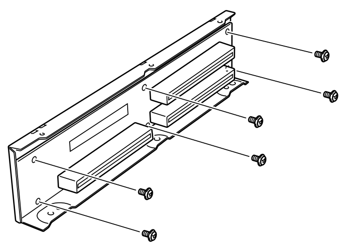
6. Remove the controller board unit and the side cover of the copying machine side all together.(9 screws)



7. Pull off the controller board at the connector (CN2) on the PCI relay board fitted to the side cover.



8. Remove the PCI relay board. (6 screws)



9. To install, reverse the removal procedure.

⚠Caution:

When installing the PCI relay board, be sure to securely plug in connectors (2 in number).

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● Expanding the memory (MU-403/MU-404/MU-405)

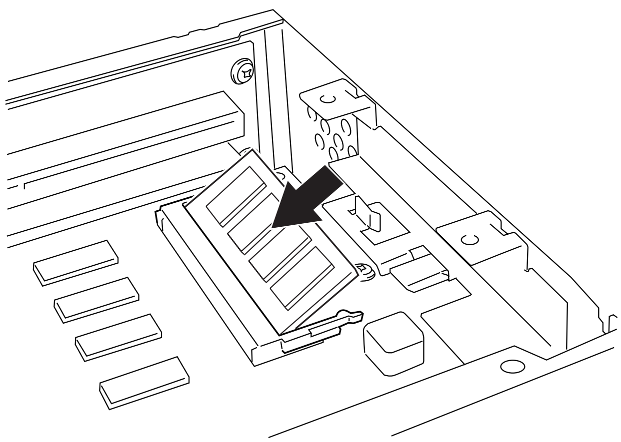
The IP-421 is provided with 32MB memory (standard specification). You can expand the memory capacity up to 160MB by installing a DIMM card additionally into a slot on the controller board.

⚠Caution:

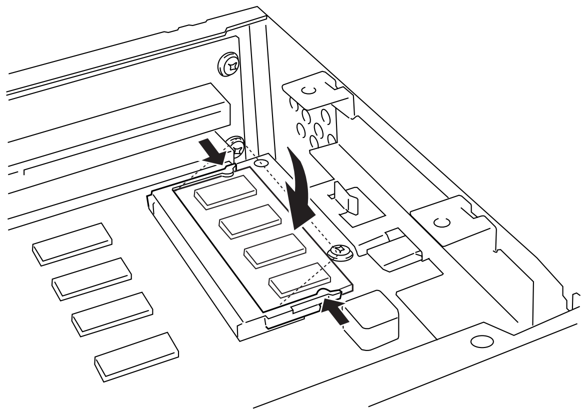
* With the memory expanded, the IP-421 can rasterise more pages during waiting previous print job than before expansion.
* If memory overflow occurs, expand the memory.
* The memory card slot is prepared for expansion of 32MB, 64MB or 128MB.
* When a memory except for Konica designation, the movement of IP421 can't be assured.

Installing DIMM

1. Insert the connector of DIMM obliquely.



2. Push the end of the DIMM and lock it with levers provided on both sides of the socket.



⚠Caution:

The DIMM card can fit into the socket only in such a direction that the notch provided on the bottom of DIMM matches with the one on the socket.

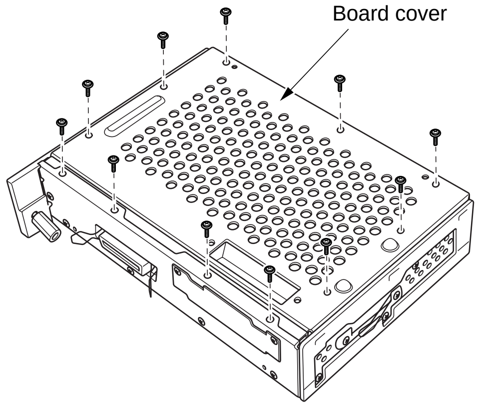
Removing DIMM

1. Release the lock levers provided on both sides of the socket. Take out the DIMM in the upper oblique direction.

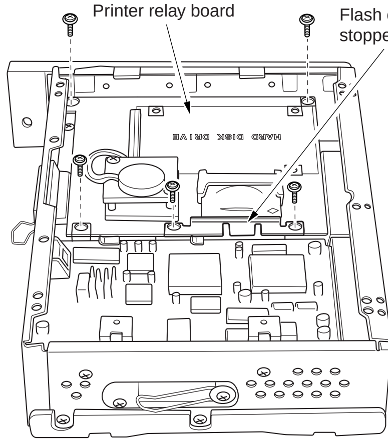
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● Installation / Removal of HD-103

1. Remove the Board cover on the IP-421. (11 screws)



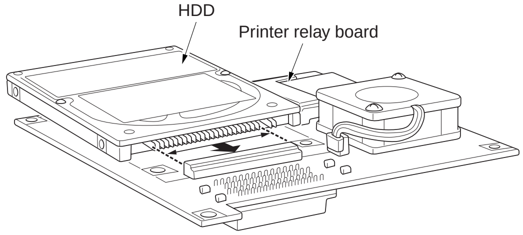
2. Remove the printer relay board. (3 screws), then remove the flash card stopper plate. (2 screws)



3. Connect the HDD to the connector of the printer relay board.

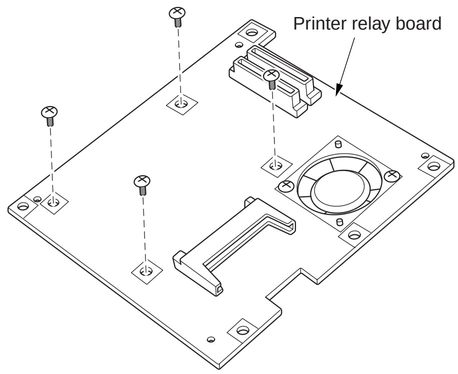
⚠Caution:

Take care not to bend or break the pins of HDD.

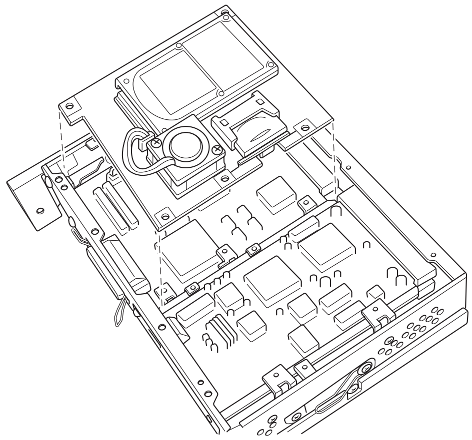


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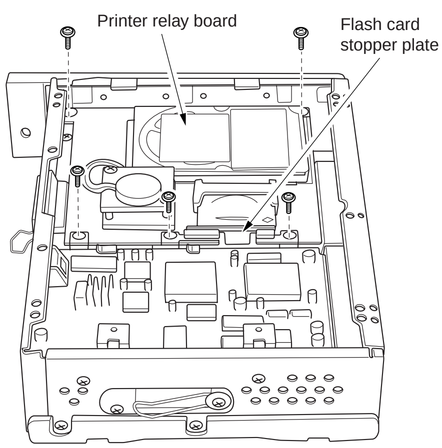
4. Fix the HDD on the printer relay board with 4 screws.



5. Fit the printer relay board into the connector of the IP-421 print controller.



6. Fix the flash card stopper plate with two screws, then fix the printer relay board with three screws.

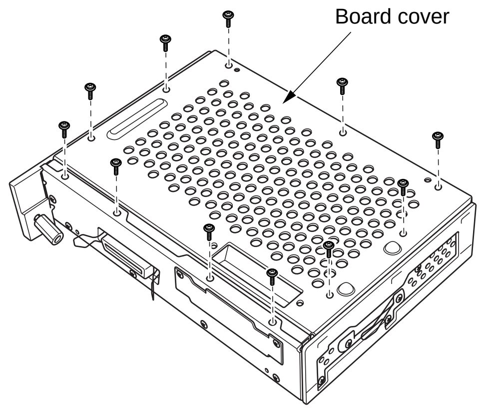


7. Fix the board cover on the IP-421. (11 screws)

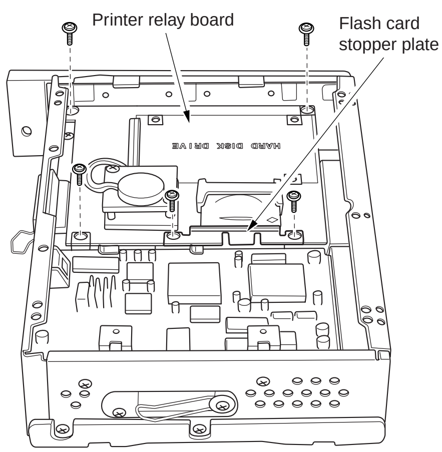
8. To remove, reverse the installation procedure.

● Installation / Removal of PostScript 3 option (PS-341)

1. Remove the Board cover on the IP-421. (11 screws)



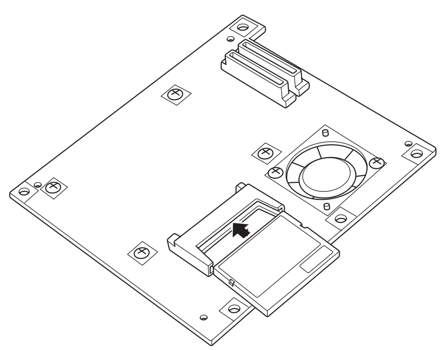
2. Remove the printer relay board. (3 screws), then remove the flash card stopper plate. (2 screws)



3. Mount the Flash card on the printer relay board.

⚠Caution:

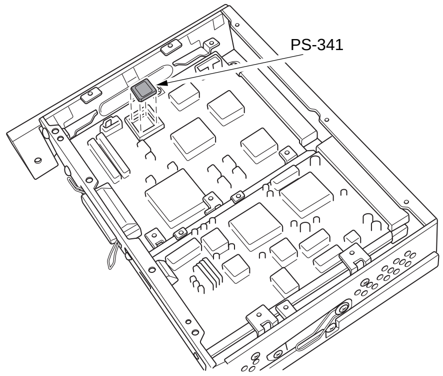
- Position the Flash card in correct direction as illustrated below.



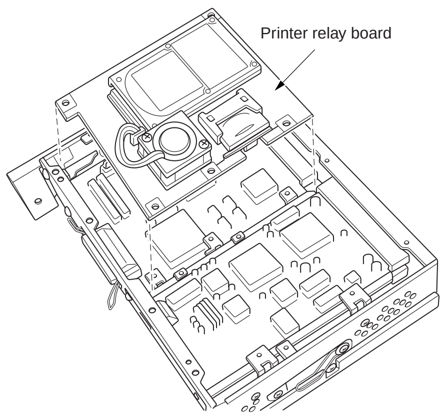
4. Mount the PS-341 on the print controller board.

⚠Caution:

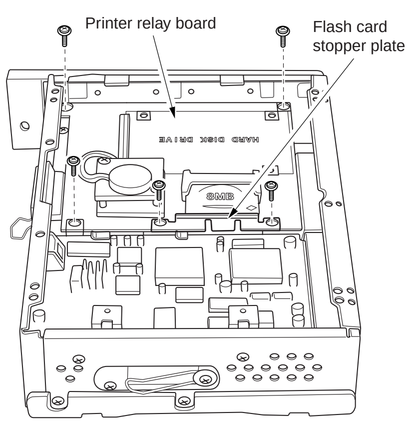
Position the PS-341 by matching the cut corner to that on the board.



5. Fit the printer relay board into the connector of the IP-421 print controller.



6. Fix the flash card stopper plate with two screws, then fix the printer relay board with three screws.



7. Fix the board cover on the IP-421. (11 screws)

8. To remove, reverse the installation procedure.

⚠Caution:

To remove the PS-341, use a PCLL removing tool.

TROUBLESHOOTING

■ Troubleshooting

This section offers a summary of information on troubleshooting that technicians could refer to easily and would minimize the time of interruption of work.

● Troubleshooting of the IP-421 and copier

Symptoms	Causes	Actions
Printer mode window does not appear on the copier's display after power-on.	No power supply to the IP-421.	Check if the IP-421 is connected with the copier properly.
"Warming up" does not disappear.	Copier is in trouble.	Locate the cause of trouble of the copier.
"Initialization " does not disappear on the copier screen.	The IP-421 has not started properly.	See the column of "IP-421 does not start".
Printout is defective, or nothing can be printed.	The controller board or some boards of the copier are defective.	Put the copier in 36 mode and perform test. If it operates properly, controller board may be failure.
IP-421 does not start.	The controller board is inactive.	Check the connector of the controller board. Replace the controller board as necessary.
	Software of the IP-421 is destroyed.	Reinstall the software of the IP-421.
Test print can be produced but not from the parallel port.	The parallel port has something wrong or the cable is wrong or, the problem is on the computer side.	Check the cables (internal/external). Perform test using a data generator or a well-proven PC/I/O cable. Replace the controller board as necessary.

Symptom	Possible causes	Actions
Test print can be produced but not from the network port.	The network card is inactive or not installed properly.	Examine the network card. Check all connectors. Replace the network card as necessary.
Test print can be produced and all ports are good, but user jobs cannot be printed.	Some software error has happened.	IP-421's software or application program has something wrong. Save the file, which failed to be printed, in the disk and analyze the problem by suitable means.

APPENDICES

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■ Upgrading the Firmware

The IP-421 uses a compact flash ROM and you can go two ways in upgrading the firmware. You can update the firmware via a parallel port or you can replace the compact flash ROM.

● Rewriting the Flash ROM

Normally, use this method.

Preparation

- Connect the IP-421 through a parallel cable to the computer that is used to upgrade the firmware.
- Prepare the replacing firmware in the hard disk of the computer or in the form of CD-ROM.
- Turn on the copier's main and auxiliary powers.

Procedure of rewriting the firmware

1. On the monitor screen of the computer, click the Start button. Click and select [MS-DOS Prompt] from [Program].

   The [MS-DOS prompt] appears.

2. Responding to the [MS-DOS prompt], designate the folder where the firmware is held. Execute a COPY command and press the Enter key.

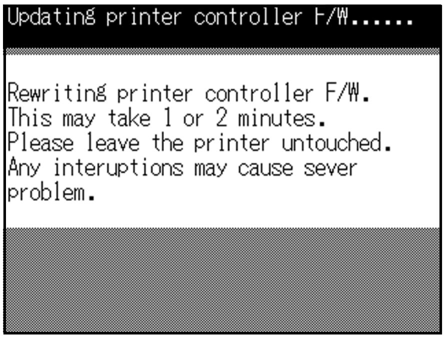
   <Example> C:\copy filename.xxx lpt1 /b

3. On completion of file transfer from the computer, a message indicating the completion of transfer appears on the copier LCD control panel. Press the OK button.

   Now rewriting the firmware starts.



A message indicates that the firmware is being rewritten.



4. On completion of firmware renewal, a message indicating the completion appears. Then turn off and on the Main SW of the copier.



● In case of failure in rewriting the firmware

If rewriting the firmware fails for some reason, it may be possible to redo the rewriting procedure when the error happened in file transfer from the computer. Turn off and on the Main SW of the copier and try the procedure again.

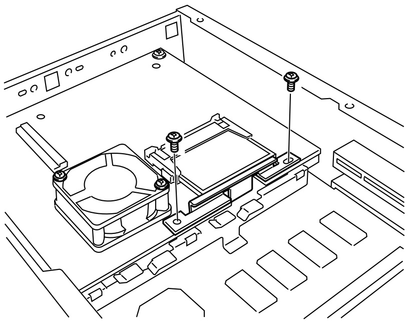
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● Replacing ROM

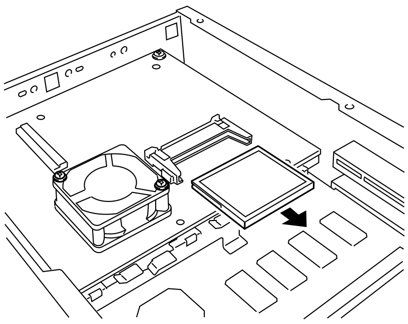
The firmware can be upgraded even by replacing the ROM.

Replace the ROM if it is impossible to update the firmware via a parallel port.

1. Remove Flash card stopper plate on sub panel.



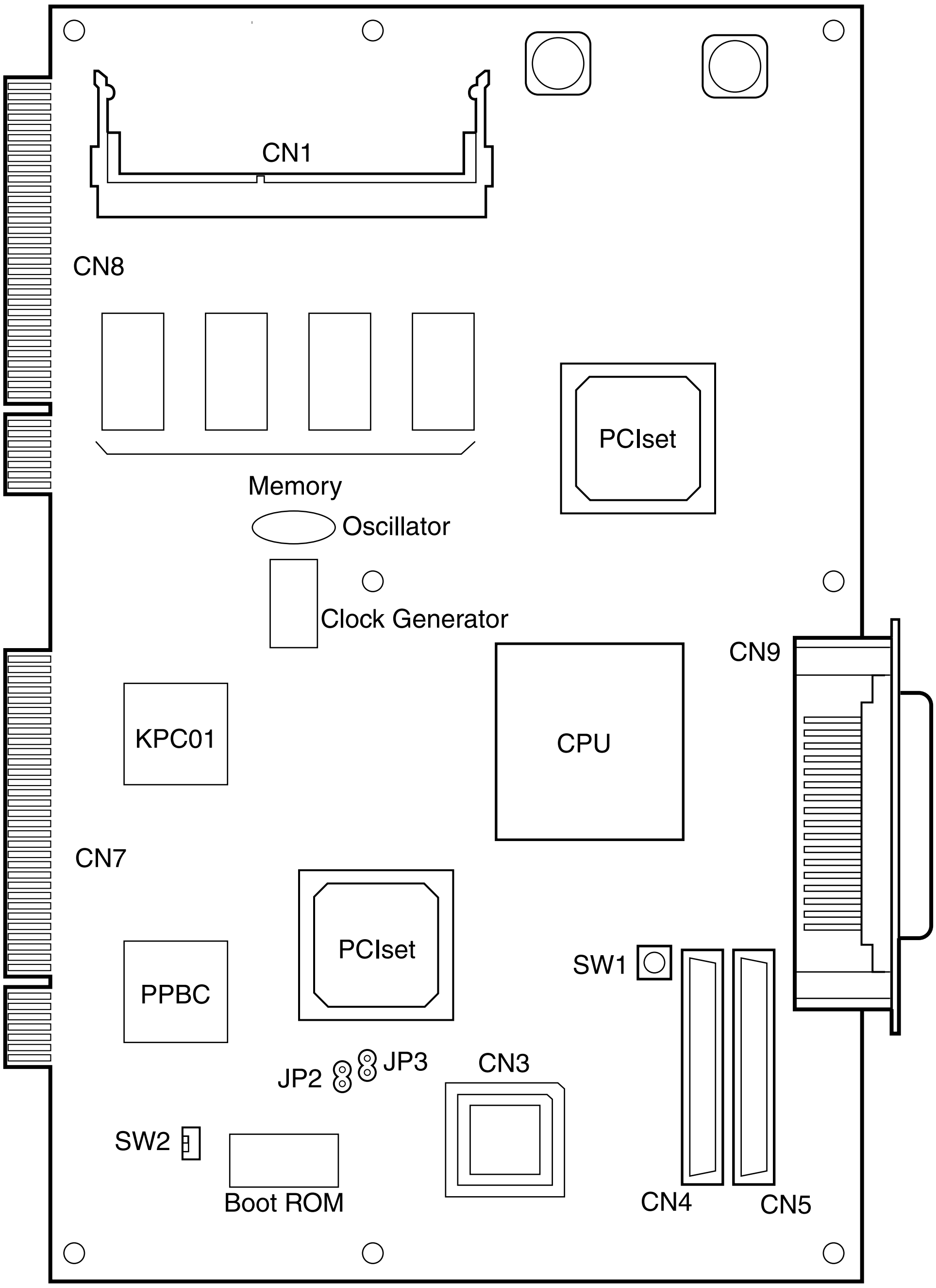
2. Remove Flash card.



3. Install Flash card.

4. Install Flash card stopper plate.

■ Functions of parts mounted on boards



● Connector

CN1: Expansion memory

CN3: PS-341 (option)

CN4: Printer relay board

CN5: Printer relay board

CN7: PCI relay board

CN8: PCI relay board

CN9: Parallel port connector

● Switch

SW1: Resets system. (only for development purpose)	No need to operate the switch.
SW2: Switch boot system. (only for development purpose)	No need to use the switch.

● Jumpers

No need to use the jumpers.

JP2: Not installed (no function)

JP3: For production purpose

● Individual ICs' functions

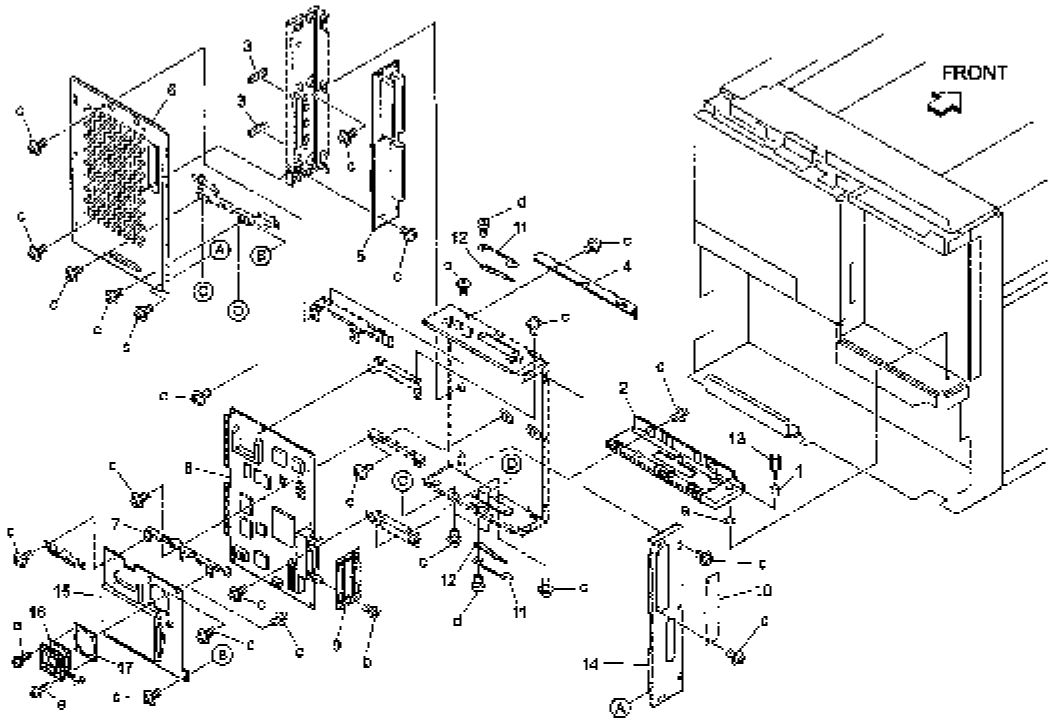
CPU:	Central processing unit
BootROM:	System booting-up parameter
KPC01:	Image rotation through 90 degrees/error diffusion processing
PPBC:	Bridge from each PCIset to the PCI bus
PCIset:	Bridge from different points to PPBC

INDEX

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HOME

IP-421



Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
1	13FM73191	Auxiliary spring	12	13FM73170	Ground spring/2
2	13FM73131	Slide part/lower	13	450011270	Screw
3	13FM73200	Electricity seal	14	13FM73030	Board mount plate/C
4	13FM73140	Slide part/upper	15	13JA-9030	Printer relay board assembly/3
5	13JA-9020	Printer relay board assembly/2	16	13JA80510	Cooling fan
6	13FM73040	Board cover plate/A	17	13JA73020	Fan mount plate
7	13FM73100	Board support plate/E	a	00Z670306	E-ring
8	13JA-9010	Printer control board assembly	b	00Z113065	Screw
9	13FM73180	Ground spring/3	c	00Z193041	Screw
10	13FM73090	Cover plate/1	d	00Z183042	Screw
11	13FM73110	Spring hold plate	e	00Z193201	Screw

Konica TECHNICAL BULLETIN

A copy of this bulletin must be given to every technician who services this model.

PRODUCT: **IP-421**
For 7020, 7030

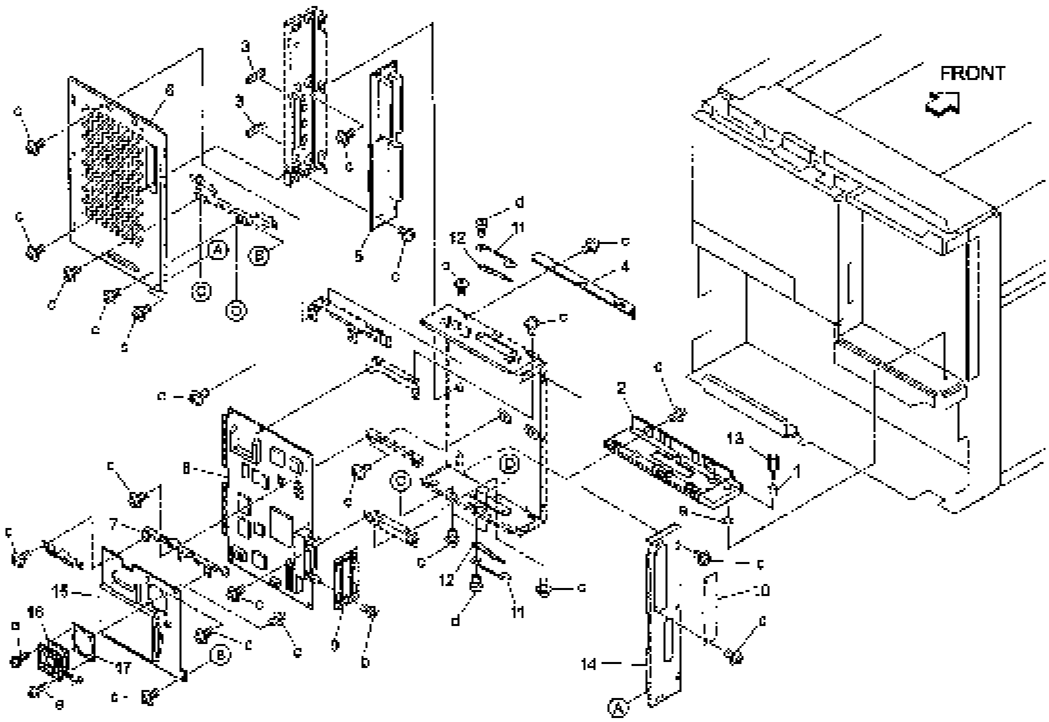
NO.: **1**

DATE: **10/30/00**

SUBJECT: **PARTS AVAILABILITY**

This bulletin provides parts information for the IP-421 print controller (PCUA 950-229). Please refer to page 2.

28-2 Corporate Publishing Services



Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
1	13FM73191	Auxiliary spring	12	13FM73170	Ground spring/2
2	13FM73131	Slide part/lower	13	450011270	Screw
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Konica

TECHNICAL BULLETIN

A copy of this bulletin must be given to every technician who services this model.

PRODUCT: **IP-421** NO: **2** DATE: **9/26/02**

For: 7020, 7025, 7030, 7035

SUBJECT: **FLASH CARD UPGRADE**

PostScript & PCL Flash Cards Included in PS-341 Kits

Purpose of Change

The 4th generation PostScript flash card (xxxxxxxxC4) included with PostScript kit PS-341 is no longer available.

Where Changed

A 6th generation PostScript flash card (xxxxxxxxC6) is now included in PS-341 kits.

With the upgrade of the PostScript flash card, an *incompatibility issue* arises with IP units equipped with 4th generation flash cards containing system code and PCL, such as unrecognizable handshaking signals, etc. between PostScript and the IP unit.

To address this incompatibility, an additional 6th generation flash card for PCL is now being included in PostScript kits for upgrading the IP unit if necessary. The table provides the compatibility of the possible flash card combinations.

PCL Flash Card (IP unit)	4th Generation	**4th Generation**	6th Generation	6th Generation
PostScript Flash Card	4th Generation	**6th Generation**	4th Generation	6th Generation
Compatibility	Yes	**No**	Yes	Yes

Applicability

PostScript kit PS-341 beginning with serial number 13JF09843 includes both the 6th generation PCL and PostScript flash cards.

Action and Result

Which PCL Flash Card is Installed?

Before installing the PostScript kit, determine what generation PCL flash card is installed in the IP unit (see illustration for ID location). If a 4th generation PCL flash card is installed (xxxxxxxxC4), use *both* flash cards provided in the kit for this upgrade.



PCL Flash Card

Preparing the Flash Cards

Prior to installing, upgrade the firmware level of the 6th generation flash cards provided in the kit to version 5.5.3 or higher for PCL and version 5.5.0 or higher for PostScript using the flash card update method. The DOS/parallel cable method is not available for PCL/PostScript combination code updates.

The PCL flash card can be identified by “13JB” printed on its label; “13JE” is printed on the PostScript flash card label.

Installing the Flash Cards

Replace the 4th generation PCL flash card in the IP unit with the newest 6th generation flash card (xxxxxxxxC6) using the instructions provided with the PostScript kit or firmware upgrade ReadMe files.